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ABSTRACT

The paper discusses how computer assisted instruction can increase student interest and participation in history courses on the college level. An instructor might make use of a computer as an ancillary data bank system, a device for examining student understanding of course material, and a means of creating simulation and other educational games. Several computer exercises are described and student reactions to these games are discussed. Student interest in and learning from computer games is generally high, although some negative feedback from students preferring a more traditional course is noted. General guidelines to teachers composing computer exercises are presented. The author advises that the games be short, simple, specific, interesting, non-ambiguous, that they emphasize important points in the exercise, and that they involve the player continuously through frequent demand for decisions. The conclusion is that use of computers in the classroom is one way of maintaining the vitality of the study of history and reversing the trend of declining enrollment in history courses due to student disinterest. (Author/DB)

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# Computer in the (History) Classroom

by

Robert G. Schafer

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Historians as a group have been slow to consider the computer as a teaching device. There are those among us who, using it as a research tool, are making very good use of it in this way. But how--and indeed whether--to call the technology in aid as an adjunct to classroom activity has not become much of a topic of discussion among teachers of History. The general consensus would seem to be that History is a discipline not readily adaptable to the kind of task at which this machine is thought to be particularly good.

Such an attitude, while certainly understandable, is unfortunate in a period when all across the country there are declining enrolments in History courses due to rising student disinterest in the traditional ways of doing things. Is there no way, we all wonder, to stem the flight from our discipline? Must we all abandon the time-honored lecture format, with its reasoned demonstration of cause and effect, in order to develop our skills as platform entertainers? There is perhaps another alternative for those of us who cannot sparkle at the lectern, namely, to become presenters of film, slide, and audio shows. In this case, our own classroom contribution might well be reduced to supplying a kind of linking commentary for someone else's more vivid canned performances. Neither alternative is very inviting, and in

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any case both might turn out to be only temporary palliatives, if that.

In the difficult situation in which we now find ourselves there is, happily, another possibility. This is for us to meet, and to master, the all-conquering machine, the object being to make it serve our purposes. Modern students tend to be much more conversant with these instruments than are their mentors, and so they see no problem in learning with the aid of such devices. Consequently, student resistance here is, to an important degree, less than it is for those of us who persist in pursuing more traditional modes of instruction in the face of rising student apathy.

In any case, whether the students like the computer or not once they sit at the terminal they find themselves compelled to become active participants in a learning experience. This is a very valuable contribution on the part of the machine. It accomplishes its participatory miracle by forcing the users into what is for most an unaccustomed degree of interaction on a rigorously academic level. The reason for this is that the casual student at the terminal soon learns that if he just sits (as many do in class) the machine--unlike an instructor--also just sits. This reaction seems to generate in every user a desire to do something, which in turn soon leads to the development in students of varying degrees of ability a strong competitive desire to beat the machine. Thus there is provoked a very high degree

of involvement in the material being presented.

It is precisely at this point, that is, the machine's capacity to motivate each and every user into making a response, that the computer does seem to have something special to offer. Ordinarily it is exceedingly difficult to rouse in every student a desire to participate; and in any case in a classroom it is impossible to satisfy even a few of those who are so aroused, especially at the very moment of arousal. But the machine can provoke such a desire, and then can meet it, for each student, immediately upon receiving his signal. Furthermore, once the student has begun to perform, the machine can direct his successive responses towards the achievement of a specific objective, generally in a more systematic fashion than can an instructor in an open classroom.

Admittedly, there are difficulties facing an Historian willing to give the computer a try in order to test these assertions. Certain of the difficulties result from the traditionalism hitherto prevailing in the discipline: e.g., most of us have not been trained in mathematics, nor do we have very much experience in using statistics. Further, any instructor wanting to try the computer, but not anxious to begin by creating his own programs, finds it not very easy to locate suitable computer-based material from elsewhere. And even if he does find something appropriate to his own classes, the chances are good that it will not

be "transportable," that is, not readily available outside its place of origin. Most frustrating of all, in many places it is difficult for those outside the computer science fraternity even to gain access to the institutional hardware.

However, these obstacles can all be overcome, granted the kind of determination which, applied elsewhere, is able to bring to light long-hidden documents, or to synthesize masses of disparate material, or to organize global conferences, or to keep in step mutually incompatible symposiasts. In short, it would surely seem to be the case that any one who practices successfully the traditional arts of the Historian, would be able to master the minimum skills needed to enlist the services of the computer to serve as a tutor in the History classroom.

In order to do this to his own satisfaction he would fairly soon wish to develop his own programs. In this area we are all pioneers, but it might help the beginner if he could keep in mind that this task is made lighter when such exercises are seen to be an integral part of a course. Seeing them in this role brings their preparation into focus as merely another challenge in the perpetual effort to present to a class relevant material in an interesting new format. Thereafter the process becomes simply one of creating a program rather than, or in addition to, composing a lecture.

With this point established it might well be asked, what kinds of tasks could a conscientious instructor safely hand over to the computer? To start with, he might consider using his new helper as a data bank which would be constantly accessible to an inquiring student. Like an encyclopedia, or a textbook, the computer could supply additional details, or could perhaps amplify some complex issues which have been all too briefly treated in a lecture or on a film. Unlike articles in an encyclopedia, or sections in a text, the material in the computer can be adapted to meet the particular needs of a given course; it can be expanded or contracted as circumstances warrant; and it can be continuously up-dated--all with very little effort once the initial program has been created. In short, the computer can be used as a marvelously flexible ancillary source of information by an instructor anxious to use class time for more general purposes.

A second major use of the computer is to examine the state of a student's understanding of course material. The main value of the machine in this regard is its ready availability to students themselves for the purpose of self-testing. That is, whenever a student feels himself to have mastered a given bloc of material, he is able, via machine, to check the actual extent of his knowledge. Should there be a student who has done poorly on such a test, he himself learns the bad news immediately. He can proceed to re-study the material, then re-test himself, as often as he wishes. Due

to the fact that the results of his work are instantly available to him, each time he repeats the process a student whose head was originally stuffed with specific bits of misinformation discovers what these are. He is then, while the topic is very fresh in his mind, encouraged to seek correct answers and thus to fix them in his memory at a time when it is most receptive to such substitution of right information for wrong. Few human instructors would dare to claim to be able to move so quickly to accomplish, for so many, this desirable objective.

For the teacher of History who is willing to enter Computerland easily the most rewarding, as it is the most demanding, use of the machine is to create simulations, which can best be described as a kind of game based either on actual historical situations or on deliberately imagined ones. The possibilities in this form of computer exercise are limitless; or rather, are limited only by the imagination, skill, and resources of the individual historian. In Flint we have experimented with a variety of formats, ranging from a simple puzzle, through some teasers based on the old parlor game of "Ten Questions," to a complicated model based on the surviving records of a 17th century English iron manufactory.

Our puzzle, "Vills and Villeins," is really a problem in Mathematics, much to the disgust of some literal minded

students. "I thought this was a course in History," they mutter, bemused by the challenge of trying to work out the area of a medieval manor from the maze of clues presented. To this complaint my stock response is that Mathematics is as much a part of History as is the activity of Plato, or of Newton, not to mention Beethoven, and Napoleon. I will admit that the solution to the puzzle is not immediately apparent, and that not everyone enjoys being baffled in this way. But as all Historians are aware, and as all schoolboys need to know, not all the answers to questions about the past come as easily as they seem to do when they are recited off the pages of a well organized lecture.

The Ten Questions type of game offers considerable amusement. Our most developed specimen is called "Florence," and it deals, obviously, with the Italian Renaissance. There are at present three separate units under this general title so when a student calls out his program he does not know whether the subject will be art, politics, religion, science, or some other aspect of the period. In any case the program begins when he is given a clue, and asked to guess the identity of the subject. A failure to guess correctly brings another clue, in general a trifle easier than the last one. So it continues until ten chances have been given. It is fun to listen in on people struggling with this game: it appears that even the most knowledgeable among us have minds

that, on occasion, go blank. Unfortunately, this seems to be the kind of exercise which speeds the process.

To illustrate to our students that the Enlightenment was more than a series of abstractions developed by a group of 18th century thinkers, we have devised a little model of Benthamite decision making, and called it "Pleasure." In this we present Bentham's Felicific Calculus in the form of a chart on which a person thinking of undertaking some specific action can grade the kinds and degrees of pleasure he might expect to experience, should he proceed to turn thought into action. With such guidance, according to Bentham, any one, by using his own reason, can make a more rational decision than he might otherwise have done. This is the kind of assumption that is better tested by cynical students, than discussed by believing professors. If anyone can, the computer should be able to make Bentham's point.

Among the games as such that we offer one, "Pugno," takes the form of a mythical battle between a Roman and a German force in which the student chooses which army he will command; he selects from within given limits the number of troops he wishes to commit; and he elects whether to mount the attack or to defend himself against the enemy. The computer, by default, commands the other side; by random selection it chooses the number of its troops; and, again by default, it is left to attack or to defend when the action begins. The

conception, and the rules, are simple; the program itself is fairly complex.

It is our assumption that, apart from the fun he might have trying to beat the machine, a student might gain certain values from this encounter. These include his becoming somewhat familiar with terms appropriate to the setting (in this case a military confrontation in the time of Augustus Caesar), and learning how to sharpen his wits by selecting from several alternatives that strategy which he thinks most likely to lead to victory (and he quickly learns whether his choice was wise). He even has the opportunity to consider the effects of chance, or rather, of unforeseen contingency, in determining the final outcome of a very common human activity, such as warfare. For many, this is indeed unconscious learning, and it is certainly cast in a more memorable form than it would be if delivered as a lecture on military strategy.

More openly didactic is another of our games, an imaginary confrontation between a Chinese force defending the Great Wall, and a threatening troop of nomadic tribesmen. We have here drawn from throughout the textbook material which purports to explain traditional Chinese policy in the area. Where the text has fragmented its explanation, presenting it in several places, we have sought to bring the student to consider the rationale for Chinese policy in a synthesis which makes its impact through focusing all the elements in a single encounter. And since the student is a party to the

fight, he is necessarily led to consider the way in which the many seemingly diverse factors which go to determine a settled policy are in fact closely interrelated. I would emphasize at this point that it is not claimed that we succeed: it is only claimed that the game is a new kind of effort to approach the old problem of how to find meaningful relationships in apparently unrelated masses of data and, in the doing, perhaps to enliven the study of History for some of our more reluctant students.

Our game called "Tycoon" is based on an idea that will appeal to every instructor, namely, that of using his own research data to provide a very personalized illustration of some general theme being treated in class. The format of this particular simulation is an outline of the structure of a 17th century English iron making concern which was, in its day, a marvel of industrial integration. The student at the computer is invited to consider himself to be the general manager of the organization; he is given specific data which had been in the possession of the long-dead manager of the concern; and he is then asked to make decisions of the kind his historic counterpart had had to make. The computer compares the student's decisions with the real ones to see how close the modern player has come to repeating the success of the early industrialist. The objects here are to illuminate 17th century business procedures and to demonstrate the complexity of the problems which had faced a businessman even before the advent of the modern industrial system. In an even more basic sense the simulation is intended to give

the idea that actual decisions made in their time by Philip Foley, and many others like him, were necessary incidents as Europe's economy began developing the amazing momentum soon to be labelled "the Industrial Revolution." Finally, we hope "Tycoon" does something to make the study of such statistical records a bit more lively than the usual kind of lecture makes them seem to be.

After all this, and for the guidance of anyone now inspired to try to create his own classroom programs whether they be tests, didactic exercises, or games, I would like to offer some very general caveats based on my own trial and error experiences. My suggested do's and don'ts are in fact blindingly obvious, but that does not mean that they are easy to follow. For the novice at this work sitting down to compose his first computer exercise for use in the History classroom, I advise:

1. Keep it short
2. Keep it simple
3. Keep it specific
4. Avoid monotony
5. Avoid pedantry
6. Avoid ambiguity
7. Emphasize relationships as step follows step
8. Emphasize the main points in the exercise

9. Emphasize a clear conclusion
10. Involve the player continuously through requiring him to make frequent decisions.

As one proceeds with his experiments in programming it helps to remember that the machine will function best if it can stimulate the student to make a clear-cut response. The patient tutor will help to teach the eager learner if the material provoking the latter's response seems to him to be deserving of his close attention. It will also help if it appears to the student that his interaction with the computer is rewarding, to himself, in some meaningful way. On the other hand, the machine will irritate the student and distract him from the task at hand if it displays trivial failings, like misspelling words, giving impudent or supercilious rejoinders, or making too frequent use of such a phrase as "I am not programmed for that answer." It will frustrate him if it rejects an answer that the student knows is, in fact, correct (this particular failing being due to the author of the program not having considered, or thought of, all the possible answers to his own questions). These are, however, mechanical faults which can be corrected easily.

There are some other problems, not trivial and not mechanical, which are likely to be encountered so soon as one moves from objective tests with clear-cut choices for answers, to the more interesting inter-active exercises which permit a wide range of personal responses. For example, the

machine is usually programmed to accept an answer as correct as soon as it recognizes a series of key words, or parts of words. It ignores other words as superfluous. But some possible other expressions, when added by a loquacious person to the correct sequence, might in fact alter the sense of the response completely, and still be ignored by the machine once it has identified what it takes to be the correct answer. It is possible for the programmer to anticipate negatives, and to structure the program so as to avoid them. But the less obvious ways of changing meaning, such as use of irony and slang, are more difficult to anticipate and, even when foreseen, are difficult to handle. When there is a failure on this basis non-communication results, and a student may be puzzled by a response from the computer to the effect that he is correct, but then there follows as the next stage in the exercise a remark which indicates that the machine believes the opposite of what the student has just said, and been commended for saying. At present the best defense against these failings would seem to be those old standbys, eternal watchfulness, and constant revision.

In conclusion, I would say that there is wide agreement among those teachers of History who have tried to use the computer in the classroom, namely, that it does indeed add a new dimension to their teaching of their subject.

Preparing material for presentation in this format offers a heady challenge even if the experience of trying to get the stuff ready is at first pretty painful. However, once the challenge has been met and suitable programs have been brought into use, the instructor gains the assurance that his role has been enhanced and his effectiveness has been extended. This professional sense of satisfaction, to the extent that it is justified, benefits students individually and the profession of teaching generally. Thus, putting the computer into the classroom would seem to be the kind of action which more of us ought to be taking as in these difficult times we continuously search for ways to maintain the vitality of the study of History.

Robert W. Schaefer